

Circles with Protosulphuret of Potassium 269

easily ascertainable by putting a drop of solution of zinc into a portion of the electrolytic solution, and first stirring them a little, by which abundance of sulphuret of zinc will be formed; and then stirring the whole well together, when it will be redissolved. The consequence of this solubility is, that the zinc when taken out of the solution is perfectly free from investing sulphuret of zinc. Hence, therefore, a very sufficient reason, on the chemical theory, why the action should go on. But how can the theory of contact refer the current to any contact of the metallic sulphuret, when that sulphuret is, in the first place, a non-conductor, and, in the next, is dissolved and carried off into the solution at the moment of its formation?

895. Thus all the phenomena with this admirable electrolyte (868), whether they be those which are related to it as an active (867) or as a passive (813, etc.) body, confirm the chemical theory, and oppose that of contact. With tin and cadmium it gives an impermeable non-conducting body; with lead and bismuth it gives an impermeable conducting body; with antimony and silver it produces a permeable non-conducting body; with copper a permeable conducting body; and with zinc a soluble non-conducting body. The chemical action and its resulting current are perfectly consistent with all these variations. But try to explain them by the theory of contact, and, as far as I can perceive, that can only be done by twisting the theory about and making it still more tortuous than before; special assumptions being necessary to account for the effects which, under it, become so many special cases.

896. *Solution of protosulphuret of potassium, or bihydro-sulphuret of potassa.*—I used a solution of this kind as the electrolyte in a few cases. The results generally were in accordance with those already given, but I did not think it necessary to pursue them at length. The solution was made by passing sulphuretted hydrogen gas for twenty-four hours through a strong solution of pure caustic potassa.

897. Iron and platinum with this solution formed a circle in which the iron was first negative, then gradually became

neutral, and finally acquired a positive state. The solution first acted as the yellow sulphuret in reducing the investing oxide (1037), and then, apparently, directly on the iron, dissolving the sulphuret formed. Nickel was positive to platinum from the first, and continued so though producing only a weak current. When weak chemical action was substituted for metallic contact at x, fig. 65 (819), a powerful current passed.